



FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 15, 20, 27, 80, 90, 95

[WT Docket No. 22-204; FCC 22-41; FR ID 92293]

Facilitating Access to Spectrum for Offshore Uses and Operations

AGENCY: Federal Communications Commission.

ACTION: Request for comment.

SUMMARY: This document, a Notice of inquiry (*Notice*) adopted by the Federal Communications Commission (Commission) seeks comment on whether changes to Commission's rules or policies are needed to facilitate the development of commercial and private wireless networks offshore. Recognizing that U.S. commercial and scientific endeavors may benefit from increased access to spectrum offshore, the Notice aims to gather information on offshore operation use cases and their potential. It seeks comment on the type of offshore uses that require spectrum, the appropriate spectrum bands to support offshore uses, and potential assignment mechanisms.

DATES: Send comments on or before [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]; and reply comments on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may submit comments, identified by WT Docket No. 22-204, by any of the following methods:

- *Electronic Filers:* Comments may be filed electronically using the internet by accessing the ECFS: <http://www.fcc.gov/ecfs/>.
- *Paper Filers:* Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.
- Filings can be sent by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street NE, Washington, DC 20554.
- Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19.

See FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy, Public Notice, DA 20-304 (March 19, 2020), <https://www.fcc.gov/document/fcc-closes-headquarters-open-window-and-changes-hand-delivery-policy>.

People with Disabilities. To request materials in accessible formats for people with disabilities (Braille, large print, electronic files, audio format), send an email to fcc504@fcc.gov or call the Consumer and Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

FOR FURTHER INFORMATION CONTACT: Nellie Foosaner of the Wireless Telecommunications Bureau, Mobility Division, at (202) 418-2925.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's Notice of Inquiry in WT Docket No. 22-204, FCC 22-41 adopted on June 8, 2022, and released on June 9, 2022. The full text of this document, including all Appendices, is available for public inspection on the Commission's website at <https://www.fcc.gov/document/fcc-seeks-input-offshore-spectrum-needs-and-uses-0>.

Ex Parte Rules

This proceeding shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules. Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must: (1) List all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made; and (2) summarize all data presented and arguments made during the presentation.

If the presentation consisted in whole or in part of the presentation of data or arguments already

reflected in the presenter's written comments, memoranda, or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with § 1.1206(b) of the Commission's rules. In proceedings governed by § 1.49(f) of the rules or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

Synopsis

I. INTRODUCTION

1. With this Notice of Inquiry, we take the first steps toward facilitating offshore operations through innovative spectrum management policy. Specifically, we seek input on whether changes in our rules and policies are needed to facilitate the development of offshore commercial and private networks. This Notice of Inquiry seeks to gather information on offshore operation use cases and their potential, including, but not limited to, the type of offshore uses that require spectrum, the appropriate spectrum bands for offshore uses, and potential assignment mechanisms. We take this action to support U.S. industrial and scientific endeavors that will benefit from offshore spectrum availability, and in return benefit the public, while also protecting existing operations such as maritime and aviation safety operations.

2. We recognize that a variety of approaches may be appropriate as we consider potential paths forward, whether through industry-led voluntary sharing measures, Commission policy and guidance, or regulation where other approaches would be insufficient. With this Notice, we seek to compile a comprehensive record on the various issues that the Commission should consider, inviting broad comment from all stakeholders. We look forward to reviewing the record that develops from this Inquiry to inform us regarding next steps that the Commission may take.

II. BACKGROUND

3. A bedrock Commission obligation is to manage and oversee the nation's radio spectrum, "maintain[ing] the control of the United States over all [] channels of radio transmission" and "provid[ing] for the use of such channels, but not the ownership thereof, by persons for limited periods of time." 47 U.S.C. 301. To fulfill this obligation, the Commission assigns spectrum rights where there is public need for spectrum. With respect to licenses on land, we continue to meet the ever increasing demands for spectrum, and generally have done so on a band-by-band or service-by-service basis as technology advances and spectrum needs evolve. We have utilized a wide array of models for assigning spectrum rights because of a wide diversity of land-based needs. With respect to access offshore for land-based spectrum, however, existing mechanisms may not be meeting current demand.

4. The Commission's initial site-based, demand-driven, licensing paradigms that remain in effect in many bands continue to provide for narrowband spectrum access in support of industry, public safety, and backhaul. The Commission uses ongoing, demand-driven licensing in the Gulf of Mexico and in other U.S. territorial waters in the Atlantic and Pacific Oceans, including areas adjacent to the Continental United States (CONUS), Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands, American Samoa, Guam, and the Northern Mariana Islands. Where applicable, such licensing (and deployments under those licenses) require coordination with Canada and Mexico. The majority of such site-based offshore authorizations are for Private Land Mobile Radio (PLMR) services, part 90 radiolocation services, aviation-ground services, and maritime coast stations. As of the publication of this document, there are more than 1,400 active site-based licenses issued offshore across many different radio services. In addition, our part 15 rules for unlicensed operation and our part 5 rules for experimental radio use have provided parties with additional mechanisms for accessing radio spectrum offshore.

5. When the Commission began to use geographic area licensing, it provided for spectrum access in the Gulf of Mexico only in certain spectrum bands, and our rules do not provide for geographic-based access in the remaining bands in the Gulf of Mexico and in all other offshore areas surrounding and within the United States and its territories. In the context of notice and comment rulemaking proceedings, the Commission adopted an area license for the Gulf of Mexico when there was demand demonstrated in the record and there were no technical, legal, or policy reasons prohibit it. With the exception of the Gulf of Mexico, there is not a geographic area license specifically designated for offshore use—e.g., there is no

market area license for water off the Atlantic or Pacific Coasts, or within the Great Lakes. We recognize that there may be offshore operations in other areas that may need access to additional spectrum and could benefit from geographic-area licensing or other assignment mechanisms aside from site-based access.

6. Offshore communications are also available or are authorized via satellite-based systems. For instance, mobile earth stations located at sea provide communications services both offshore and in international waters. These include Mobile Satellite Services (MSS) provided by such companies as Inmarsat and Iridium, as well as services provided via Earth Stations in Motion (ESIMs) by such companies as SES, Intelsat, Telesat, and ViaSat. ESIMs are increasingly used to deliver broadband to maritime vessels—including enterprise services and broadband to cruise ships. In addition, satellite-based communications currently play a significant role in providing communications to oil rigs and platforms offshore. In this inquiry, we are exploring the potential benefits of providing additional avenues for providing offshore access via terrestrial communications services. We also note that part 80 of the Commission’s rules provides spectrum to vessels for maritime radio, such as Automatic Identification System (AIS) channels and other uses. This Notice does not seek comment on Maritime Radio, but rather on other offshore spectrum use cases, including additional needs of vessels.

III. DISCUSSION

7. This Notice of Inquiry first seeks comment on the actual demand for offshore spectrum and whether the Commission needs to facilitate spectrum usage for offshore operations. This Inquiry recognizes different spectrum rights models that could facilitate offshore operations and seeks comment on which model would best serve spectrum needs offshore. We do not intend to structure our analysis by specific offshore regions or zones. Instead, we seek more broadly to understand the extent of the demand to use offshore spectrum and more generally where that demand is concentrated. Next, we seek comment on assignment mechanisms that would best serve the Commission’s goal of effective and efficient use of spectrum. We also seek comment on the potential for unlicensed use and spectrum leasing models to meet offshore spectrum needs, and on individual spectrum bands that may facilitate offshore operations. Finally, we seek comment on whether the approaches taken by other countries in making offshore spectrum available can inform our policy.

A. Demand for Offshore Spectrum

8. To better guide any potential change to Commission rules or policies, we seek to understand how extensive the need is for offshore spectrum access. In light of this, we seek comment generally on the demand for offshore spectrum. We recognize that, in the past, demand was initially driven largely by the offshore oil drilling industry's need for spectrum access offshore, but we anticipate that demand may have grown among other industries as well. What kinds of offshore operations would benefit from greater access to spectrum, both now and in the future? What distance from land would those operations be conducted? Are the use cases that need offshore spectrum fixed or mobile in nature, or a combination of both? Are there commercial or private maritime or aeronautical uses in addition to those already provided for by our rules? What types of services might entities consider deploying offshore? Are there both commercial and private operations offshore that require spectrum access and, if so, how are private versus commercial operations' respective needs for offshore spectrum different? To what extent are current or anticipated satellite-based services responding to various types of demand for offshore spectrum-based services? What are the potential benefits of making spectrum available for terrestrial-based Wi-Fi or mobile networks in addition to the spectrum available as of the publication of this *Notice*?

9. We recognize that the Commission has granted several experimental licenses operating at various frequencies to facilitate scientific experimentation and exploration offshore. Descriptions of these experiments include communications, data gathering, and command and control of offshore platforms, sensors, and unmanned aerial systems for purposes of oceanography and navigation. We seek comment on how these experimental licenses might inform future offshore radio services, and in particular whether the Commission should consider adopting new offshore radio service rules to provide service and technical rules for devices used to support any of these applications.

10. Do commenters expect that spectrum demand will vary significantly by type of offshore operation or use case? How much spectrum do different types of offshore operations or uses need? How much contiguous spectrum do stakeholders anticipate needing? Are the needs localized or is the demand for communications or other services over long distances? What are the boundaries of offshore operation use cases? How far from the shore might demand for spectrum extend? Will the amount of spectrum

needed for a given use or operation be static or will the amount of spectrum needed change over time? Is there a demand for wireless spectrum to provide backhaul from operations offshore? Commenters should specify the individual offshore operation, use case, or service discussed in their responses.

11. One use case that we anticipate may have various offshore spectrum needs is the construction and operation of windfarms in the Atlantic and Pacific oceans, and potentially beyond. We anticipate that such needs may include: providing wireless services to the site during construction of the windfarm; testing, daily operation, and scheduled and emergency maintenance and replacement; communications to ships and entities on shore; and communication capability among offshore operators in adjacent areas and between those operators and first responders. Is this an accurate overview of uses for spectrum at windfarms? Are there other uses? How do these needs differ from those on offshore oil platforms, which utilize both terrestrial-based and satellite-based communications services? How much spectrum would a windfarm need to support these kinds of operations, and would the amount of spectrum vary by stage of the project?

12. Another potential use case is for communications services by vessels in coastal waters. Is there a need for additional offshore spectrum access models that would provide greater opportunities for vessels at sea to access mobile networks or connect onboard Wi-Fi networks to the internet? We recognize that there are satellite-based services currently being provided to vessels at sea. What are the potential benefits of making additional spectrum available from terrestrial-based Wi-Fi or mobile networks?

13. What other use cases exist that require offshore spectrum access that is not being provided under the existing access models? Are there other industrial or scientific research demands for offshore spectrum? We seek comment generally on other industries that might have a need for offshore spectrum. Are there offshore operations that utilities may conduct? Is there a need for telephone service to subscribers working offshore, like there is in the Gulf of Mexico? Commenters should include specific examples for industries operating offshore and uses of offshore spectrum.

14. We also seek comment on the degree to which terrestrial technologies using spectrum allocated for fixed or mobile wireless operations could supplement the demand for offshore spectrum access currently served by satellite technologies using spectrum allocated for satellite operations. Further,

how does the Internet of Things (IoT) landscape affect demand for offshore spectrum? What sort of IoT technologies require additional offshore spectrum? What other relevant use cases should we consider? For example, space launch operations can involve the offshore retrieval of launch components. What are the spectrum needs for these activities and how well suited are the authorization mechanisms that are currently being used? Are there any potential impacts to satellite operations from increased offshore terrestrial operations?

15. Additionally, we seek comment on the infrastructure needed to support offshore spectrum operations. Specifically, what infrastructure is needed to support base stations, end-user equipment, fixed transmitters, beacons, and other equipment offshore? Is the infrastructure likely to be fixed/stationary, drifting in the water, airborne, or deployed in another way? What are the needs—infrastructure related or otherwise—of offshore operations that may sometimes be fixed but at other times are mobile or need to move locations over time, such as operations by the fishing industry, scientific researchers, and cruise ships?

B. Spectrum Rights Models

16. To the extent that there is a need for increased access to spectrum offshore, we seek comment on what kinds of spectrum rights should be conveyed to meet the demand. Possible models include shared spectrum rights, authorizations for secondary operations, and authorizations with primary rights. We seek comment generally on these approaches, or combinations thereof, including the advantages and disadvantages of each and any associated cost and benefits.

17. In advocating for or against particular spectrum rights models, we encourage commenters to consider not only the circumstances and needs of offshore operations (including incumbent operations requiring protection), but also the unique characteristics of radio transmissions over open water. For example, commenters should discuss the impact of the propagation of signals over open water on preventing harmful interference. Commenters should also discuss the use of directional antennas, including those with advanced beamforming capabilities, and the potential for these measures to increase opportunities for coexistence with incumbent operations. Similarly, commenters should consider whether the use of antenna gain patterns to reduce transmissions at high angles could reduce interference risk to incumbent aeronautical operations not otherwise protected by ground clutter or terrain.

18. *Shared Spectral Rights.* We seek comment on whether a spectrum commons approach could serve the needs of offshore spectrum. Under a spectrum commons approach, all spectrum is shared and there is no expectation of interference protection. Could a spectrum commons model, or similar shared spectral rights model, offer enough spectrum for offshore operations and enough interference protection? Why or why not? Under such an approach, would individual offshore operators or users coordinate with each other for interference protection and resolution? How could this best be enabled? For example, would a band manager or spectrum manager be needed? Are there certain types of offshore operations that could utilize a shared model, while others need primary or secondary rights? Why or why not? Commenters should discuss in detail advantages and disadvantages of a spectrum commons or similar shared spectrum rights approach for offshore operations, including the effect on incumbent operations. What spectrum bands are good candidates for shared spectrum use? What bands should not be considered on a shared basis for offshore operations? What are the costs and benefits to this approach, as opposed to primary or secondary use authorizations?

19. *Secondary Authorization.* Next, we seek comment on providing secondary spectrum rights to offshore operations. Under a secondary rights framework, the incumbent user would have primary use of the band at issue, consistent with the terms of its authorization, and the incumbent would have an expectation of protection of interference from any secondary users. Offshore operations could be granted authority to act as secondary users that cannot cause harmful interference to primary operations in the band (whether that primary user is on land or, in the case of the Gulf of Mexico or existing site-based authorizations, in the water). Would an individual authorization with secondary status model meet the needs of some offshore operations, but not others? Why or why not? How might the sufficiency of secondary use vary based on the specific use case or phase of the project at issue?

20. If a secondary rights model is appropriate, should the primary license, if on land, be modified to allow secondary use offshore? How far offshore should the modification extend? Should the Commission allow secondary use offshore by both the primary licensee on land and another user? In either instance, what would be the best mechanism to do this? Are there any other secondary use models that the Commission should consider for offshore operations? Which spectrum bands should be considered for secondary use offshore? Commenters should discuss the advantages and disadvantages of

any approach proposed, and the associated costs and benefits.

21. *Primary Authorization.* Finally, we seek comment on the need for individual authorizations with primary rights for offshore operations, with the expectation of exclusive use and protection from interference from other users. Do certain offshore operations require primary spectrum rights? Why or why not? If an operation requires primary rights, commenters should address not only why, but also whether that need will change over time. Would the spectrum supporting primary rights need to already be supporting LTE or other next-generation wireless services? Which spectrum bands would be possible candidates for primary rights authorized on an individual basis to offshore operations, and why? Commenters should discuss advantages and disadvantages to primary rights authorized to support offshore needs, and the costs and benefits of such an approach.

C. Assignment Mechanisms for Initial Licensing

22. We seek comment generally on which assignment mechanisms might be best suited for the needs of offshore operations. We also seek comment on using more than one assignment mechanism for licensing spectrum offshore, as we recognize that operations seeking to use spectrum offshore may have a diversity of funding sources and budget cycles. Commenters should discuss how our choices of assignment mechanism could best ensure diversity in access. Commenters should also discuss the costs and benefits of the different mechanisms.

23. *License-by-Rule and “Licensed Light” Access Models.* We seek comment generally on whether the Commission should provide additional offshore spectrum access through spectrum rights models that have minimal or no registration requirements. These can include a “license light” approach, where users submit a simplified registration form before using specific frequencies and sites, or a license-by-rule approach, where users are permitted to operate without registering or obtaining an individual license so long as they meet the qualifications to operate and their operations are consistent with the Commission’s rules. Such models generally offer low barriers of entry but do not allow for exclusive spectrum use. They are premised on all entrants being able to share the available spectrum resource with little or no formal coordination and through operation under the framework provided by the applicable service rules. How well would these kinds of approaches serve offshore operations, and how do their benefits compare to those associated with other licensed assignment mechanisms? Should the

Commission consider, for example, issuing nonexclusive, offshore-area licenses with site or area registrations in the Universal Licensing System (ULS) or a third-party database to facilitate coordination among offshore operators? Why or why not? Are there existing registration-based access models that could work well here?

24. *Ongoing, Demand-Driven, Licensing On a Site-by-Site Basis.* The Commission has significant experience implementing demand-driven, site-based, licensing mechanisms. Under this approach, an applicant requests authorization to construct at a specific transmitter location (or multiple locations) and expands its service by applying for additional sites as needed. The prime examples of this model of licensing are in the context of Private Land Mobile Radio and microwave services. Could a site-based licensing approach meet the needs of offshore spectrum operations? And would it meet the Commission's goal of advancing innovative and efficient spectrum policy?

25. The Commission has also relied on ongoing, demand-driven, licensing in the Cellular context and in its 700 MHz Relicensing regime. In the Cellular Service, after the initial licensing of geographic areas and buildout to establish service contours, applicants have applied for individual licenses only where there was a need for coverage, growing their network on a site-by-site basis. Is the Cellular Service licensing model something the Commission should consider for meeting the needs of offshore operations? Is it a good analogy for offshore licensing, or are there differences at sea versus land that would make that approach less desirable here? Assuming it is an appropriate model, could the Commission rely on the existing Cellular Service licensing rules for offshore licensing? Why or why not, and how would those rules need to be changed or updated if used as a starting point for potential offshore licensing rules?

26. Should the Commission use something similar to its 700 MHz Relicensing regime as a model for demand-driven licensing to meet offshore needs? In the 700 MHz Relicensing regime, the Commission had a single Phase I process for applicants to file applications for authority to operate in unserved areas. Phase II is an ongoing process that allows eligible parties to apply for any unserved areas that may remain after the Phase I process is complete. Would this approach be appropriate to meet the needs of offshore operations? How would "unserved" be defined in the offshore context? What are the advantages and disadvantages of this model if applied to offshore licensing? Could the Commission rely

on this kind of model, regardless of which spectrum band is used?

27. *Negotiations-Based Licensing.* In the 900 MHz band, the Commission established a transition mechanism based primarily on negotiations between prospective overlay licensees, whether in-market or an adjacent market, and incumbent licensees. Would a negotiations-based authorization process meet offshore spectrum needs? Would an approach similar to the one used in the 900 MHz band facilitate more rapid offshore deployment? Why or why not?

28. *Geographic Area Licensing.* In many services, including many of our more recently licensed flexible-use services, the Commission has issued geographic area licenses for exclusive use. With geographic area licensing, a licensee is authorized to construct anywhere within a particular geographic area's boundary (subject to certain technical and other requirements) and generally does not need to submit additional applications for prior Commission approval of specific transmitter locations. We seek comment on whether geographic area licensing is appropriate for offshore licensing. Are there advantages to geographic area licensing over site-based licensing in the offshore space? Why or why not? If so, should we assign geographic area licenses offshore for all 3GPP standardized bands? Should there be multiple geographic area markets to cover any given U.S. coastal area or shores of the Great Lakes in any given band, or just one in each?

29. If we were to assign geographic area licenses offshore, should we then require offshore licensees to protect land-based licensees and adjacent-area, co-channel, offshore licensees using existing applicable signal strength limits, or would our rules need to be adjusted? What are the interference concerns we should consider, and would they vary by band? Would the ability to protect terrestrial licensees vary by band? Would existing bands' construction requirements or license terms need to be adjusted for offshore license areas depending on the use case? If so, how? Would a geographic area license be impractical if the offshore operation is mobile or on a structure such as a barge, and therefore could move between different geographic areas? Commenters should discuss all other advantages and disadvantages of geographic area licensing.

30. *Other Considerations.* We note that in the Gulf of Mexico, the Commission has licensed spectrum using various approaches. How should our experience in the Gulf inform our approach for other offshore areas? Is offshore spectrum too complex for one assignment mechanism? Would multiple

assignment mechanisms better suit offshore operations' spectrum needs? In other words, should the Commission consider using a variety of mechanisms, depending on which offshore area is at issue and the level of demand for spectrum usage? For example, is there an immediate and competing demand for certain areas in the Atlantic Ocean where windfarms are already being built, but less demand in the Great Lakes or off the Pacific coast, and should there be different assignment mechanisms implemented to reflect these differences? What is the demand, if any, for additional spectrum access off the shore of Alaska into the Arctic Ocean?

31. What would be the appropriate zones in which either an onshore or offshore licensee has exclusive authority to operate, subject to specific coordination and interference resolution mechanisms? Parties should discuss boundaries based on the Gulf of Mexico, state and county lines, or any other relevant consideration. Commenters should also discuss how far seaward the Commission could extend existing land-based service areas in a proposed band.

32. We also note that § 309 of the Communications Act requires assignment via competitive bidding for acceptance of mutually exclusive applications, with an exemption for public safety radio services. If demand were such that mutually exclusive applications were filed for a license offshore, an auction could be required to assign that license, unless an exemption applied. To what extent might the public safety exemption apply to assigning offshore spectrum? Are there other issues we should keep in mind regarding licenses assigned via competitive bidding for offshore purposes?

33. Are there any U.S. treaty obligations that may be relevant in assigning spectrum for offshore operations depending on which body of water is implicated? If yes, what are they and how should we take them into account? We note also that there are maritime and other definitions of what constitutes offshore areas. To what extent are these definitions relevant for our purposes here?

D. Unlicensed Spectrum Use

34. We also seek comment on how unlicensed spectrum access under our part 15 rules can support the needs of offshore operations. These rules allow operation without a license and provide low barriers for entry and wide flexibility in how the spectrum can be used. However, unlicensed operations must be conducted at low power levels that might limit the distance at which the signals could practically be used for offshore applications (such as in long-distance vessel-to-vessel or shore-to-offshore

communication scenarios). Furthermore, unlicensed operations must not cause harmful interference to licensed services and must accept any harmful interference received.

35. Our existing rules generally permit unlicensed operation in offshore locations, although there are limitations that preclude such use in certain bands. Here, we seek to better understand how unlicensed operations are being used and how unlicensed use can be expanded in the offshore environment. What specific types of offshore operations are well-suited for deployment under our unlicensed rules and what applications might be better realized through licensed access models, and why? Do commenters anticipate that an expansion of licensed access models in offshore locations would affect existing unlicensed operations or future deployments, and if so how? What are the bandwidth requirements of those applications that can be realized through unlicensed use, and is there sufficient capacity and equipment presently available for deployment? Are there particular bands that would be especially well suited for unlicensed operations in offshore locations? Finally, are there changes to our existing rules that could facilitate the use of spectrum on an unlicensed basis in offshore locations?

E. Access via Spectrum Leasing

36. Another potential vehicle for accessing offshore spectrum, in addition to the assignment mechanisms discussed above, could be a spectrum lease arrangement. The Commission's spectrum leasing rules apply to all "included services," and include Wireless Radio Services in which commercial or private licensees hold exclusive use rights. We seek comment on whether spectrum leasing might meet some (or all) of offshore operational needs, and whether this would vary by use case. Are there incumbent licensees with spectrum available for leasing? Are there existing terrestrial or offshore licensees interested in leasing spectrum for offshore operations? Would the Commission need to modify the authorizations of coastal land-based licensees to first provide them with rights that extend to offshore areas, as a threshold to enabling leasing of those rights? Why or why not? Should the Commission provide incentives for license holders to lease spectrum, and if so, what would those incentives look like? Would leased spectrum provide enough bandwidth for offshore operations? Should the Commission update the list of services to which our spectrum leasing rules apply to include offshore spectrum operations to facilitate the possibility of leasing? Should the Commission consider leasing combined with other approaches? Are there other rule or policy changes the Commission would need to take to enable a

leasing marketplace for offshore spectrum?

F. Spectrum Bands for Offshore Operations

37. Different spectrum bands provide different spectral properties and utility that can meet different needs. Given the potential use cases for offshore spectrum discussed above, we seek comment generally on which individual bands, or a combination thereof, could best support the various needs of offshore operations.

38. What type of spectrum would best support offshore use? What characteristics are needed, such as high bandwidth, low latency, particular propagation characteristics, or other properties? Would a band used to support offshore operations need to already have certain equipment standards, such as 3GPP? Which specific bands, or combination of bands, would best support offshore use? Possibilities could include 600 MHz, 700 MHz, 800 MHz, 900 MHz, or AWS bands. Are any of these bands appropriate for offshore use? Why or why not? Would AWS-1 or other low-band frequencies accommodate offshore operations' spectrum needs? Would the interference protections in the aforementioned bands be enough to accommodate offshore spectrum and incumbent users?

39. Are there other bands currently used for commercial or private wireless networks that we should consider? For each band proposed, commenters should address whether there any issues regarding existing operators, whether large enough blocks or sufficient bandwidth would be available for offshore operations, and what modifications, if any, would be needed to service rules to accommodate offshore use. Are there advantages and disadvantages of any spectrum band considered?

40. We recognize that Commission rules contain performance requirements in certain bands. Would offshore operations be able to meet the existing performance requirements in the band(s) commenters propose and should they be required to meet them? How might those performance requirements need to be adjusted given the difference of use cases and operations offshore versus on land? How might this vary based on whether the operations are private or commercial, and how localized the service offering is? Would license terms need to be adjusted given potential differences between deploying on land versus at sea?

41. Are there spectrum bands that we should not consider in order to protect incumbents in the band, or for other reasons? If so, which bands and why? Commenters should take into consideration

the existing operations of both federal and non-federal users, particularly those uses related to public safety and other critical national purposes, including maritime and aeronautical endeavors. We seek comment on how to ensure protection of such operations as appropriate. Commenters should discuss interference protections for both incumbents and new offshore operations in any proposed band(s). We seek comment generally on what additional interference protections, for any band considered, offshore operations would need.

42. We note that offshore incumbent uses may differ from operations being protected by commercial or private wireless operations onshore, and thus protection requirements for a given band's use offshore may be different from those required for a band's onshore use. In other words, commenters should not assume that a band's use for a particular purpose onshore necessarily means it is well-suited for that purpose offshore.

G. Offshore Spectrum Access in Other Countries

43. We note that other countries authorize use of offshore spectrum. We seek comment generally on the extent to which frameworks used abroad provide any insight for how the Commission might move forward in facilitating offshore licensing here. In the Netherlands, for example, Agentschap Telecom, part of the Ministry of Economic Affairs and Climate, has issued Tampnet and T-Mobile offshore 700 MHz licenses in the North Sea, using what it termed a "distribution by demand" model that was implemented by means of an auction. Ofcom, the United Kingdom telecommunications regulator, issues unified Spectrum Access Offshore Mobile licenses that cover all of the United Kingdom "mobile bands" (800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2.3 GHz and 3.4 GHz), but only for areas not covered by the rights granted to existing mobile network operators. The Spectrum Access Offshore Mobile license authorizes use of spectrum on a non-protection and non-interference basis, leaving coordination up to the licensees.

44. Do the Ofcom or North Sea models provide useful lessons for spectrum use by U.S. offshore operations? Why or why not? Do differences in geography and regulatory frameworks in the United Kingdom and the Netherlands warrant different approaches offshore in the United States? Are there other models for offshore spectrum access used by other countries that could provide guidance for our approach here, while still furthering our goals of innovative spectrum management and efficient

spectrum use?

H. Additional Issues

45. We invite comment on other possible approaches for the Commission's consideration. For instance, would convening Commission-led workshops comprised of a diverse array of experts from industry and government be helpful? Would any pilot project be appropriate, and if so, which particular frequency band(s) should be considered? Are there further studies that could help inform the Commission on important considerations with regard to offshore operations? Are there other studies, efforts, or analyses that we should consider in this proceeding? If so, we ask that commenters identify them and explain why they should be considered. We also seek comment on whether there are any security or other concerns to any of the approaches discussed herein. What international coordination issues may arise if we provide spectrum for offshore operations such as IoT?

46. In addition, the Commission, as part of its continuing effort to advance digital equity for all, including people of color, persons with disabilities, persons who live in rural or Tribal areas, and others who are or have been historically underserved, marginalized, or adversely affected by persistent poverty or inequality, invites comment on any equity-related considerations and benefits (if any) that may be associated with the various approaches and issues discussed herein. Specifically, we seek comment on how the various approaches that the Commission may consider may promote or inhibit advances in diversity, equity, inclusion, and accessibility.

IV. ORDERING CLAUSES

47. Accordingly, IT IS ORDERED that, pursuant to sections 1, 2, 4(i), 301, 302, 303, 332, 403 of the Communications Act of 1934, as amended, 47 USC §§ 151, 152, 154(i), 301, 302, 303, 332 and 403 this Notice of Inquiry IS ADOPTED.

48. Authority for this Notice may be found in sections 1, 2, 4(i), 301, 302, 303, 332, 403 of the Communications Act of 1934, as amended, 47 U.S.C. 151, 152, 154(i), 301, 302, 303, 332 and 403.

Federal Communications Commission.

Marlene Dortch,

Secretary,
Office of the Secretary.

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